

# BICYCLE LANES

## OVERVIEW

The Lincoln area bike trail system is a wonderful amenity for the community. Over 90 miles of trails have been developed and the system is planned to be expanded greatly in the future as opportunities present themselves and as funding becomes available. It is a system of which to be proud. The bicycle system in Lincoln is not limited to just trails either. A signed on-street bike route system exists as well and provides additional links and connections for bicyclists. However, there still exist gaps in the system making it difficult for riders to traverse the city in some locations, and not all bicyclists are comfortable riding on the street along the bike route system without a dedicated lane for bicyclists. One potential answer to filling the gaps in the local bicycle system is the idea of implementing bike lane facilities. Such an amenity may also help achieve the Comprehensive Plan goal to have a bike facility within 1 mile of all residents. It is possible that with proper coordination, a complete system of bike trails, on-street routes, and dedicated bike lanes will help surpass this 1 mile goal.



As defined in the AASHTO Guide for the Development of Bicycle Facilities, bike lanes are “a portion of a roadway which has been designated by striping, signing, and pavement markings for the preferential or exclusive use of bicyclists.” There is much that goes into developing bike lane facilities and this document intends to identify many of the standards and issues that need to be included and addressed in any potential bike lane implementation program. It is not the intent of this document to specifically identify routes for bike lane development, although some preferred routes have been identified for further study. This document also does not specifically address the issue of bicycle facilities and bike system connections in Downtown Lincoln, but the general guidelines and information identified in this document will be useful for any further study of this topic, especially as part of the pending Downtown Master Plan effort. It is hoped that the result of this effort is the establishment of a useful source of information on bike lanes so that future implementation of such facilities will be more effective and attainable.

## **IMPLEMENTATION ISSUES**

The implementation of bike lanes is not intended to replace bike trail facilities within the overall bike system, especially if certain routes contain bike trails already. Bike lanes are not intended to create redundancy in the system either. Instead, bike lanes are intended to be a part of the bicycle system that compliments and strengthens the overall bicycle and transportation network. On-street bike routes will continue to be part of the system, although some existing bicycle routes may be evaluated for opportunities to provide bike lanes for the same reasons those routes were originally chosen to be on-street bike routes. Also, involving the biking community when formally identifying routes to implement bike lanes is imperative to both tap into the knowledge base of the biking community, as well as to create a spirit of cooperation and inclusion in the planning process.

The issue of bicycle amenities in Downtown Lincoln will require careful planning and engineering and will be addressed in the Downtown Master Plan process set to begin in mid-2004. On a related note, coordination and discussion with the University of Nebraska will be needed to help attain full connectivity in both the Downtown and University areas.



Another important aspect of any bike lane implementation program is education and public information efforts. As a new form of transportation in the community, both drivers and bicyclists will need to learn the rules of the road as they apply to bike lanes. Dissemination of bike lane information through public announcements, public meetings, and the use of the City/County web page will be needed.

Formal training seminars for users, drivers, and administrators will also need to be considered to make sure the community is informed and knowledgeable about the topic. The idea of having an advocate on city staff to help implement a bike lane program is one that should be considered as well. Much of the planning, education, and administration of a bike lane implementation program could be accomplished through such a position.

It should be noted that bike lanes are not intended to be implemented on limited access highways. Also, placement of such facilities along State highways will be an issue that will need to be worked out with the Nebraska Department of Roads. Finally, coordination with the County Engineer's office will be needed if striped bike lanes and/or widened shoulders for bicycle users are to be implemented on County roadways. In the example of getting bicycle facilities on County roadways that may be more rural in nature, adding or improving paved shoulders often can be the best way to accommodate bicyclists in rural areas.

## **WHY BIKE LANES?**

Bike lanes help define road space, decrease the stress level of bicyclists riding in traffic, encourage bicyclists to ride in the correct direction of travel, and signal motorists that cyclists have a right to the road. Bike lanes help to better organize the flow of traffic and reduce the chance that motorists will stray into the cyclist's path of travel. They also identify bicycling as a viable means of travel in the community. In summary, bike lanes do the following:

- support and encourage bicycling as a means of transportation
- help define road space
- promote a more orderly flow of traffic
- encourage bicyclists to ride in the correct direction, with the flow of traffic
- give bicyclists a clear place to be so they are not tempted to ride on the sidewalk
- remind motorists to look for cyclists when turning or opening car doors
- signal motorists that cyclists have a right to the road
- reduce the chance that motorists will stray into cyclist's path of travel
- make it less likely that passing motorists swerve toward opposing traffic
- decrease the stress level of bicyclists riding in traffic

With such an amenity added to the overall bicycle system in Lincoln, critical connections and a higher acceptance of bicycling as a legitimate mode of transportation can be attained. It should be noted here, however, that with any implementation of bike lane facilities comes with it the necessary financial commitment to not only construct the facilities initially, but also to maintain the lanes at a high level such that the user has a safe amenity to bike on for many years.

The issues of snow removal, street sweeping, and ensuring good pavement condition in the bike lane area are key. When there is debris in the bike lane such as snow, sand and dirt from winter snow and ice removal efforts, a bicyclist is at risk by either losing traction when attempting to travel over and through the debris, or by being forced to swerve out of the bike lane area and travel into the automobile lane of travel. Maintaining adequate pavement and using proper signing and pavement markings is equally important in order to have a safe and useful bike lane system.

## **BIKE LANE CONSTRUCTION STANDARDS**

Bike lane design is covered in detail by the AASHTO *Guide for the Development of Bicycle Facilities* and should be referenced for complete standards and additional information. For the purposes of this report, some limited information on standards will be provided below to offer an overview of the basic design guidelines for bike lanes. Much of the information provided here comes directly from the *FHWA Course on Bicycle and Pedestrian Transportation* which can be found on-line at <http://safety.fhwa.dot.gov/pedbike/univcourse/swtoc.htm>.

The minimum width of a bike lane should be 5 feet against a curb or adjacent to a parking lane. On streets where the bike lane is adjacent to the curb and the curb includes a 1-foot to 2-foot gutter pan, bike lanes can be a minimum of 4 feet wide (this width does not include the gutter pan since bicyclists are typically unable to use this space).

Wider bike lanes are recommended on streets with higher motor vehicle speeds and traffic volumes, or where pedestrian traffic in the bike lane is anticipated.

Since bicyclists usually tend to ride a distance of 2.5 feet to 3.5 feet from the curb face, it is very important that the pavement surface in this zone be smooth and free of structures. Drain inlets and manholes that extend into this area cause bicyclists to swerve, having the effect of reducing the usable width of the lane. Where these structures exist and the surface cannot be made smooth, bike lane width should be adjusted accordingly. In addition, regular maintenance is critical for bike lanes. Also, bicycle friendly grates should be considered whenever possible.

Bike lanes should be constructed to normal full-depth pavement standards since motor vehicles will on occasion cross them, or may use them as a breakdown area.

### **Bike Lane Location Within the Street Cross-Section**

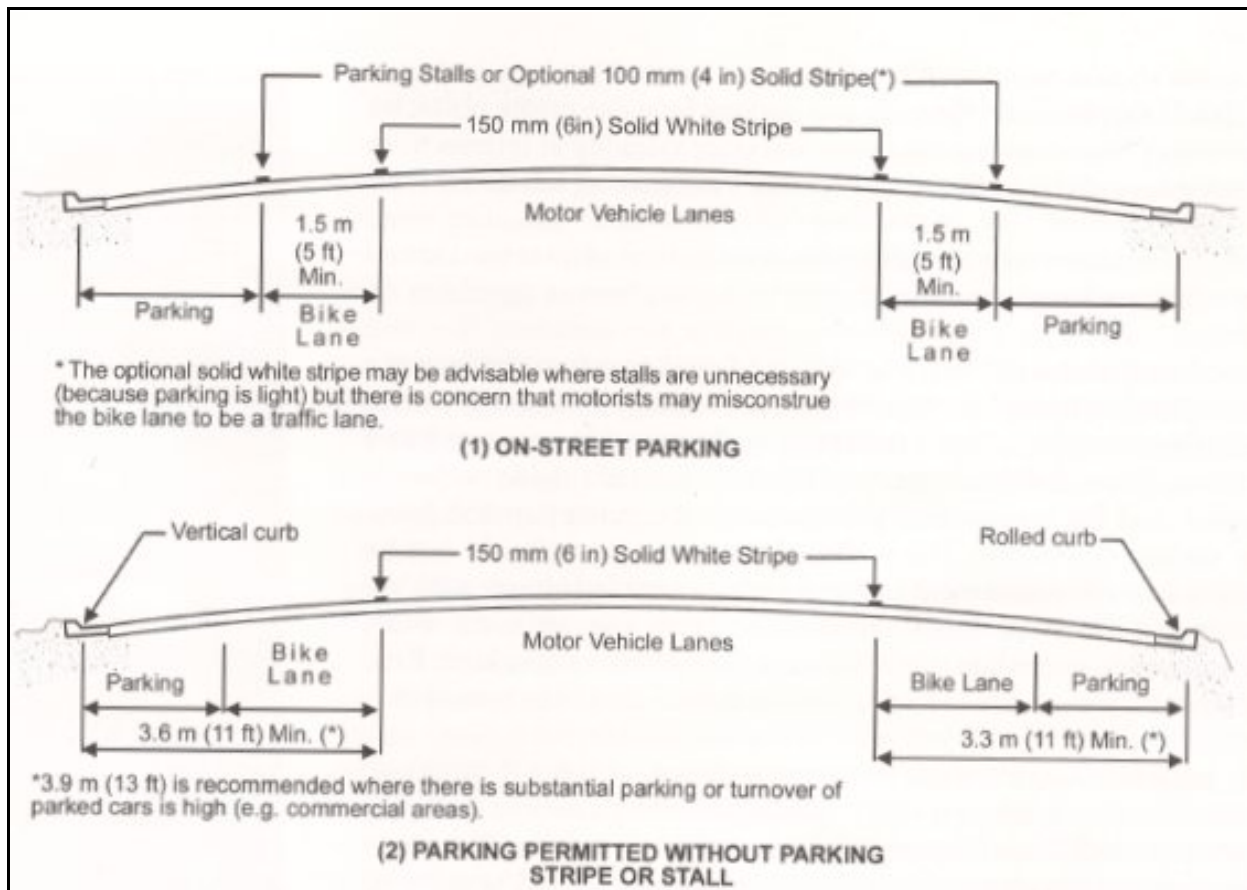
Bicycle lanes are always located on both sides of the road on two-way streets. Since bicyclists must periodically merge with motor vehicle traffic, bike lanes should not be separated from other motor vehicle lanes by curbs, parking lanes, or other obstructions. Two-way bike lanes on one side of two-way streets create hazardous conditions for bicyclists and are not recommended.

On one-way streets, bicycle lanes should be installed on the right-hand side, unless conflicts can be greatly reduced by installing the lane on the left-hand side. Left-side bicycle lanes on one-way streets may also be considered where there are frequent bus or trolley stops, unusually high numbers of right-turning motor vehicles, or if there is a significant number of left-turning bicyclists.

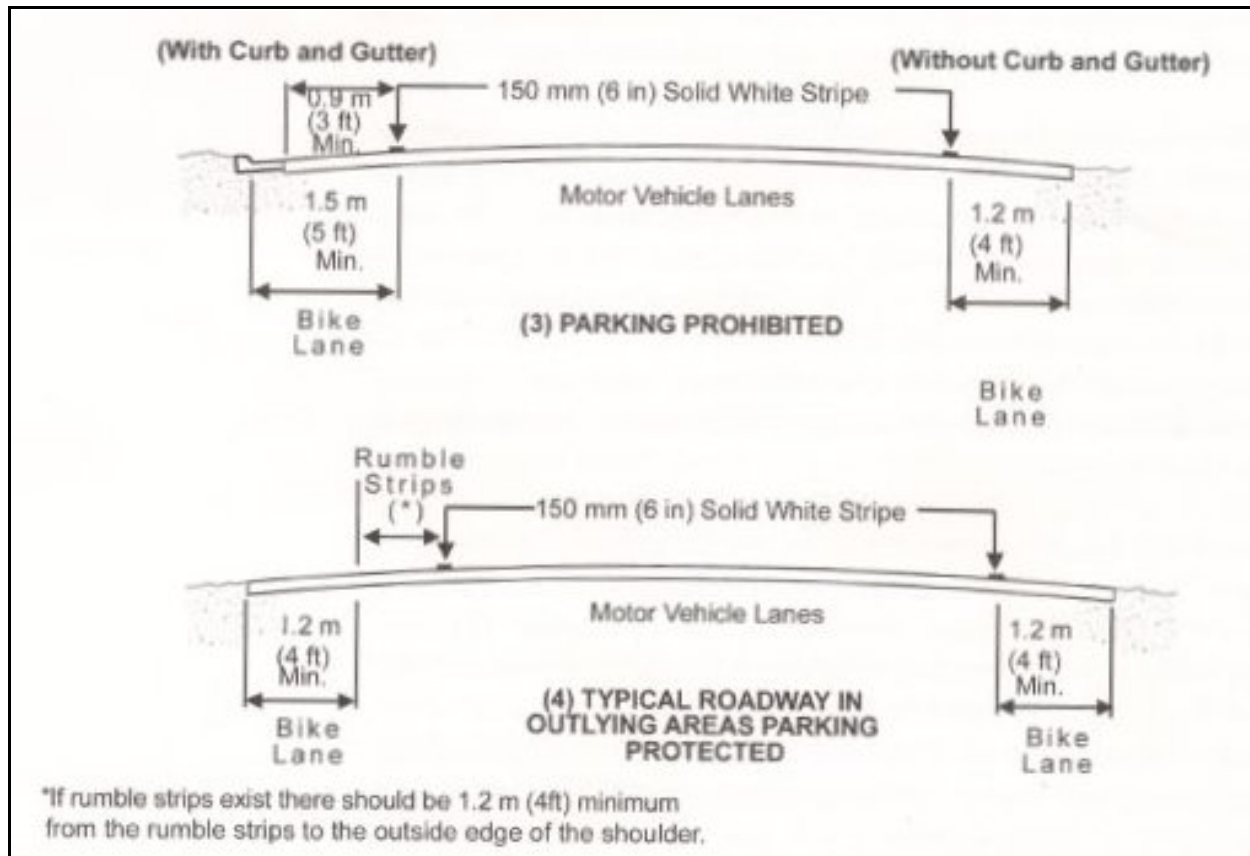
Bike lanes are not usually placed next to diagonal parking. Diagonal parking causes conflicts with bicycle travel such as drivers backing out having poor visibility of oncoming cyclists, and parked

vehicles obscuring other vehicles backing out. If parking is required along a street under consideration for a bike lane, that parking should be parallel parking and the bike lane should be placed adjacent to the parking lane with a minimum bike lane width of 5 feet.

The figures below and on page 6 show typical roadway cross-sections with bike lane facilities under the following conditions: 1. Cross-section with a bike lane with on-street parking. 2. Cross-section with a bike lane with parking permitted without a parking stripe or stall. 3. Cross-section with a bike lane when parking is prohibited. 4. Cross-section for a bike lane on a typical roadway in outlying areas.



SOURCE: *Guide for the Development of Bicycle Facilities*



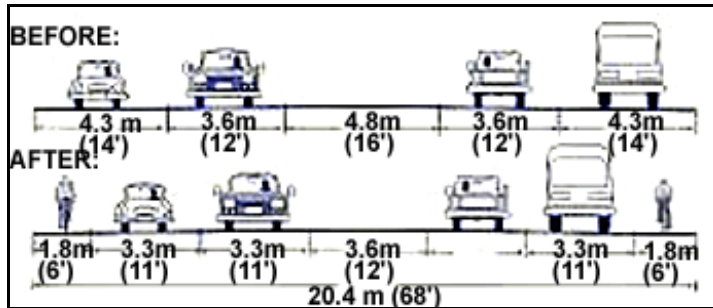
SOURCE: *Guide for the Development of Bicycle Facilities*

### Re-striping Existing Roads With Bike Lanes

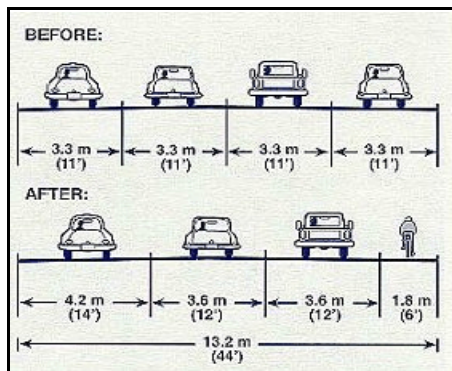
While the above standards are most easily applied to newly constructed or reconstructed streets, it is often a reality that most urban streets are surrounded by built-up environments. Finding extra width for bike lanes is often very difficult when retrofitting existing streets. There are innovative solutions that could be implemented to solve this situation and many of them are explained here.

Since many roadways are built originally without bike lanes in their cross-sections, bike lanes, if desired on these streets, must be accommodated by retrofitting bike lanes onto many existing urban roadways by re-striping the existing roadway to add bike lanes. A traffic engineer should always review any such effort to ensure good engineering principles are in use and travel lane widths remain within AASHTO minimums. The following is a range of examples from the *FHWA Course on Bicycle and Pedestrian Transportation*.

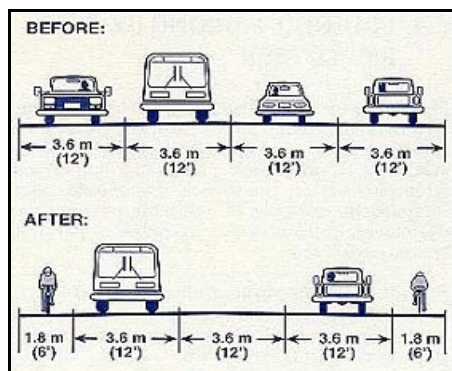




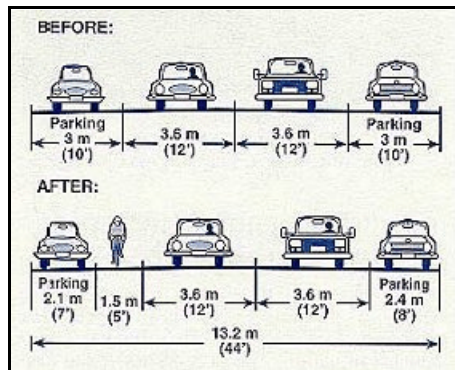
The above example shows how the narrowing of a center turn lane and the travel lanes can accommodate bike lanes on both sides of a 2-way street.



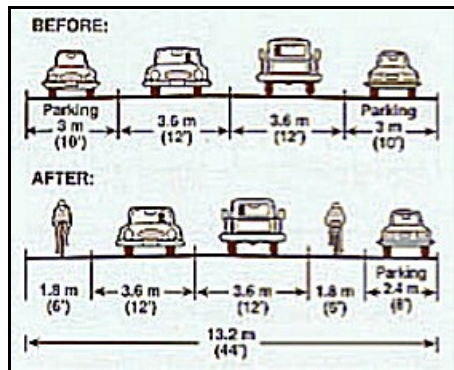
Here, one travel lane is removed on a one-way street to allow for a bike lane and to provide wider travel lanes.



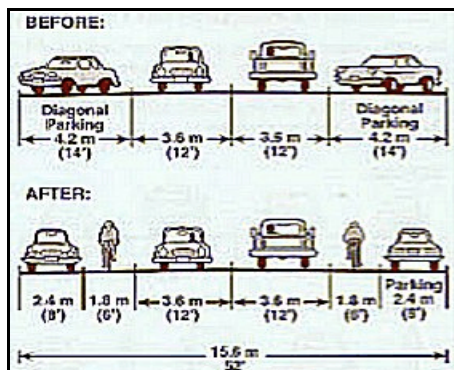
Here, the travel lanes are reduced from four to two with a center turn lane added and bike lanes in each direction added.



Here, parking lanes have been narrowed to allow for a one-way bike lane facility.

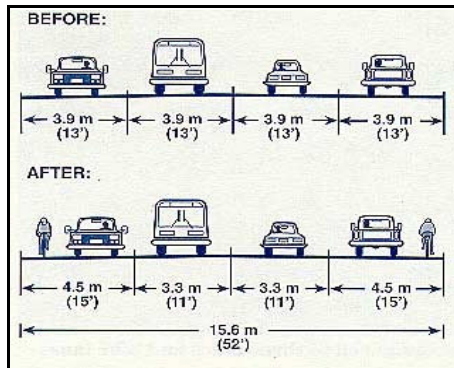


Here, parking is removed on one side of a two-way street to accommodate bike lanes.



In this example, diagonal parking is changed to parallel parking on a two-way street to provide space for bike lanes.





Above, lanes are re-striped to allow a wide curb lane that allows for bicycle use in the outside lanes.

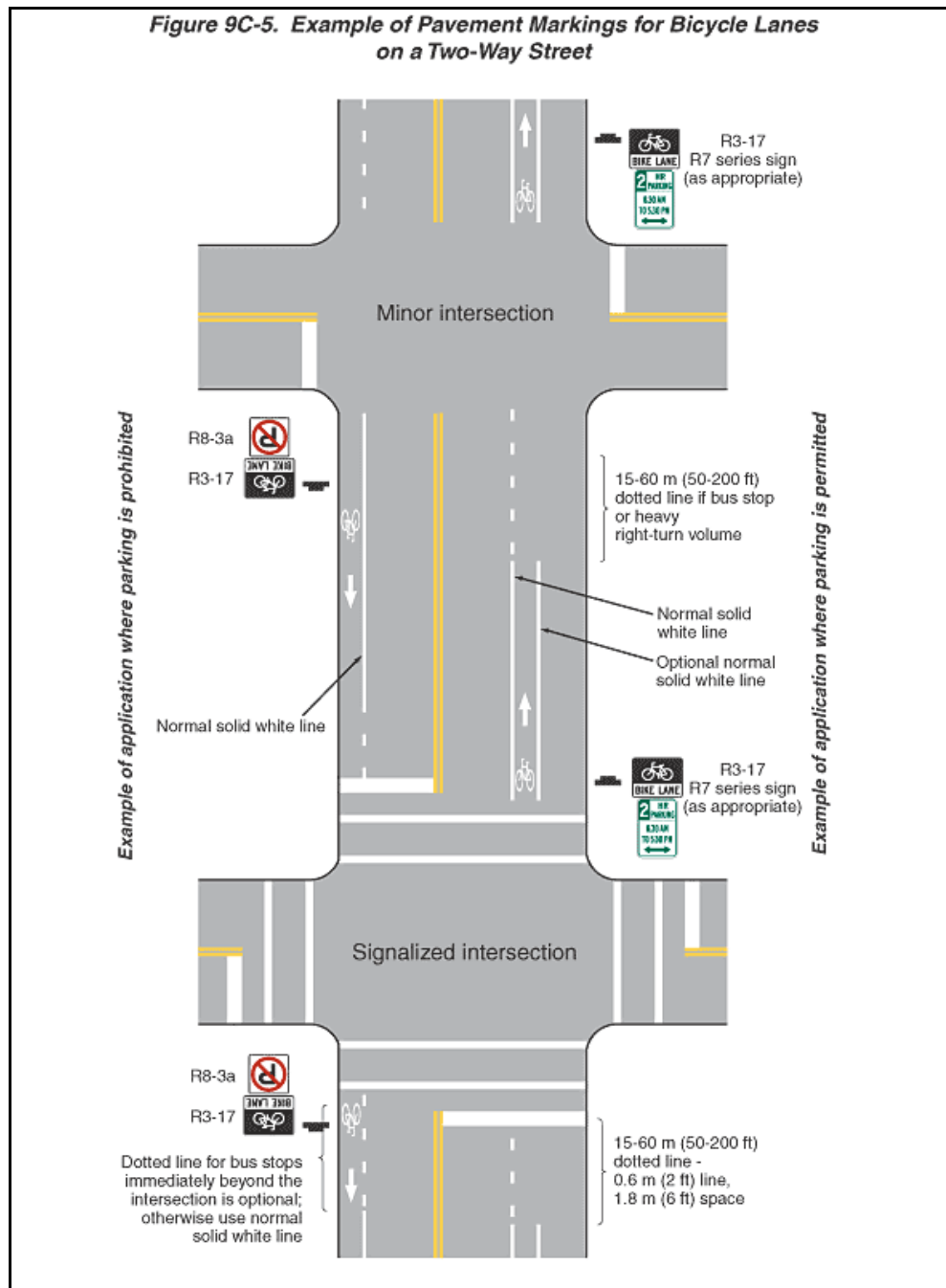
### **Bike Lane Pavement Markings and Signing**

The *Manual on Uniform Traffic Control Devices* (MUTCD) section 9C addresses standard bike lane markings and should be referenced for complete standards and additional information. For the purposes of this report, some limited information on standards will be provided below to offer an overview of the basic striping and signing guidelines for bike lanes.

The stripe between the bicycle lane and the adjacent motor vehicle lane should be a 4 inch wide white line (minimum width). Six to eight inch wide lines provide an even clearer division of space, and are highly recommended. Where parking is allowed next to a bike lane, the parking area should be defined by parking space markings or a solid 4 inch wide stripe.

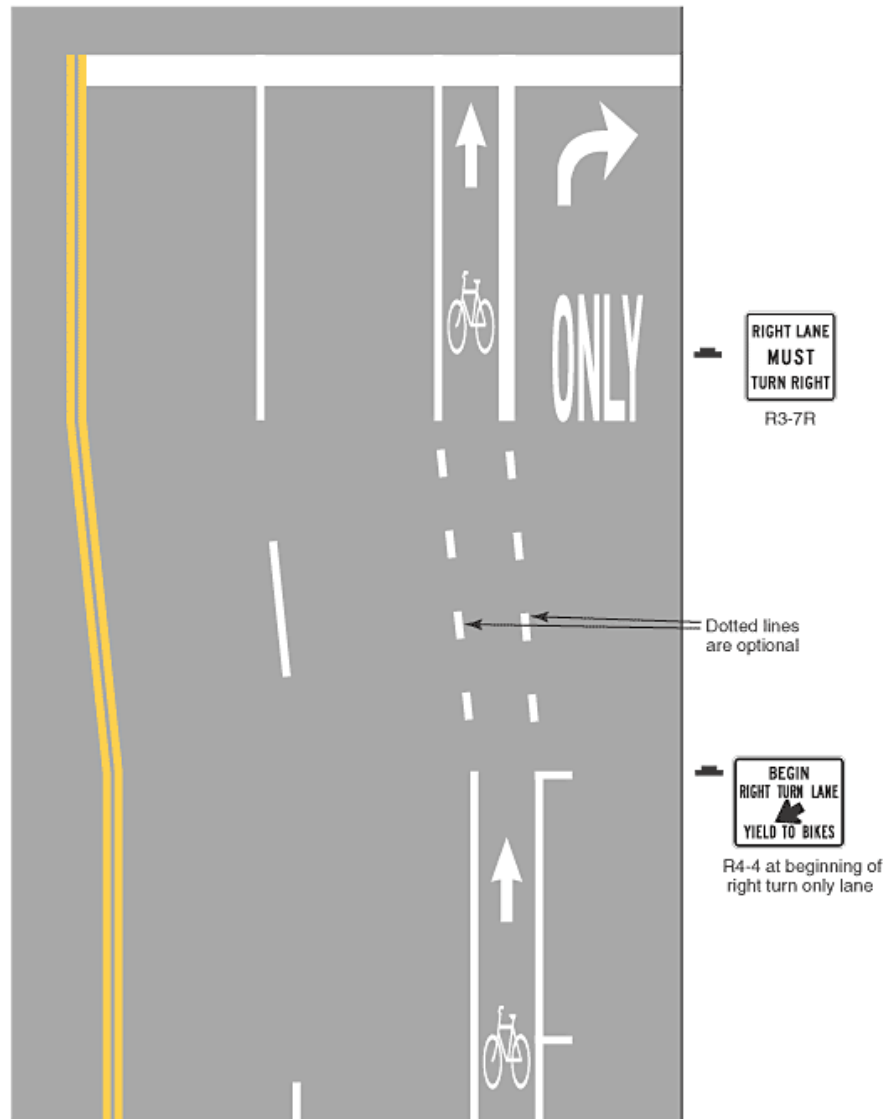
Care should be taken to use pavement striping that is durable, yet skid-resistant. Reflectors and raised markings in bike lanes can deflect a bicycle wheel, causing a bicyclist to lose control. If reflective pavement markers are needed for motorists, they should be installed on the motorist's side of the stripe, and have a beveled front edge.

The figures on the next 4 pages provide examples of striping and signing requirements for bike lanes under various conditions.

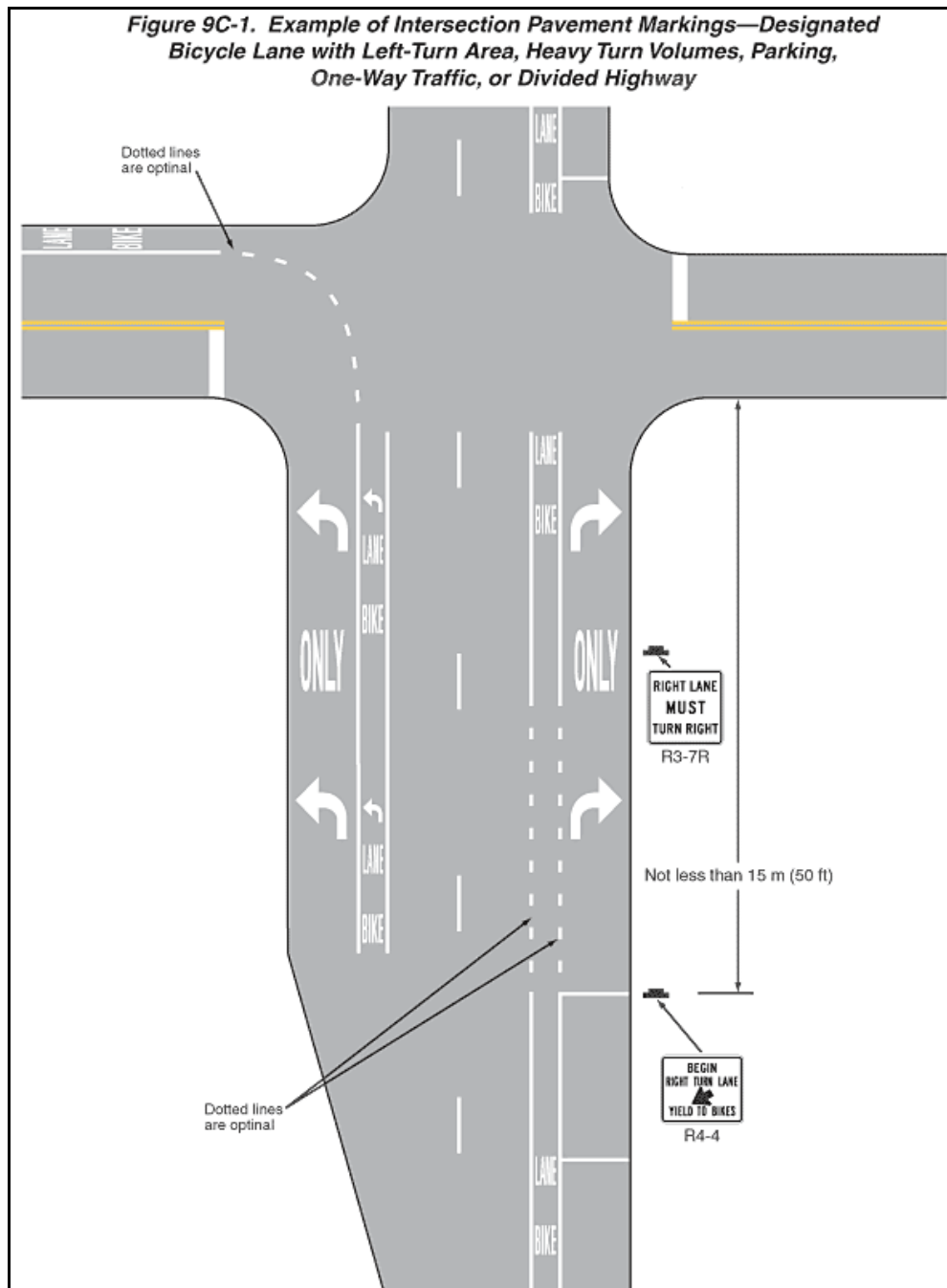


Source: MUTCD

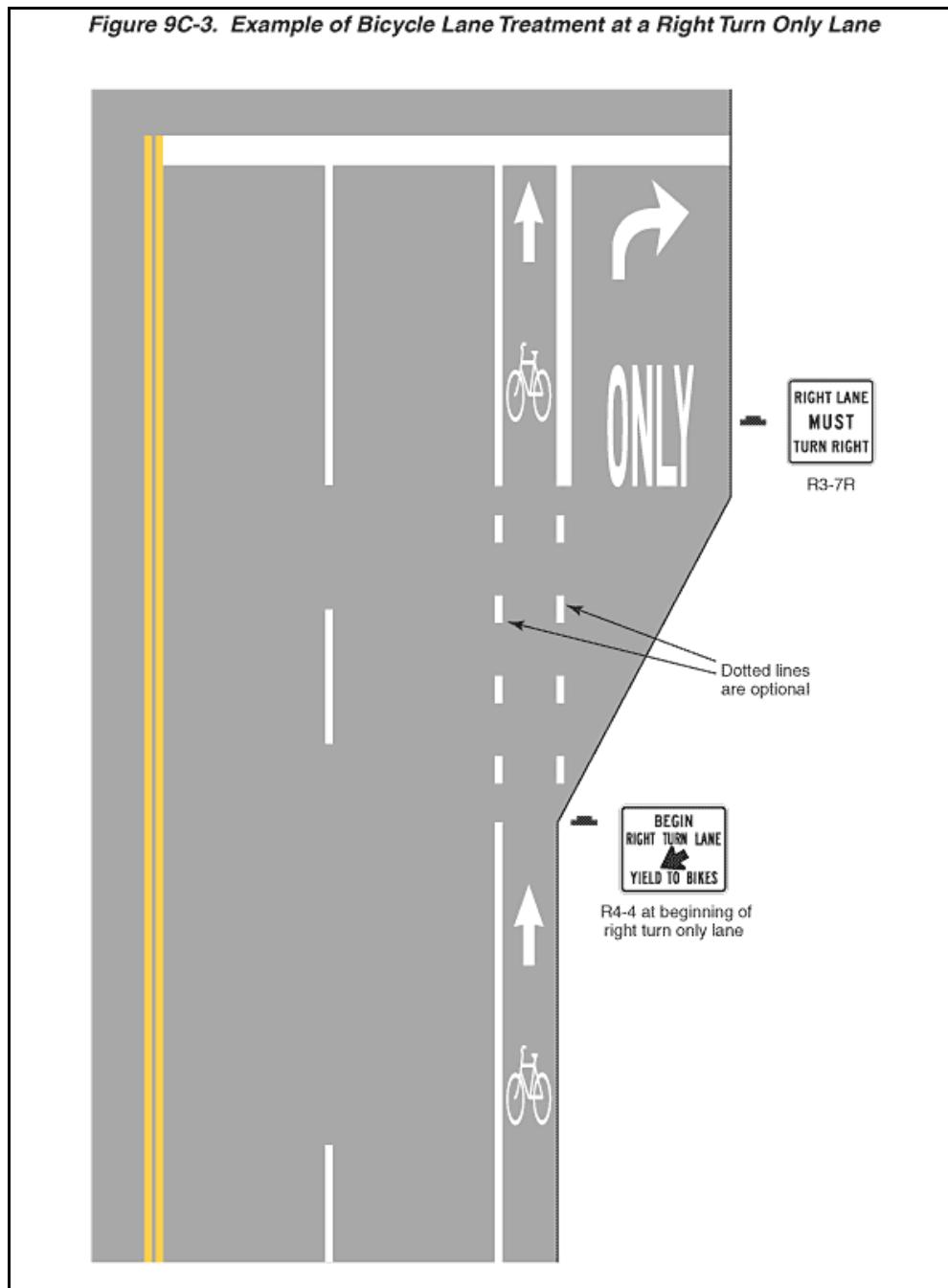
*Figure 9C-4. Example of Bicycle Lane Treatment at Parking Lane into a Right Turn Only Lane*



Source: MUTCD

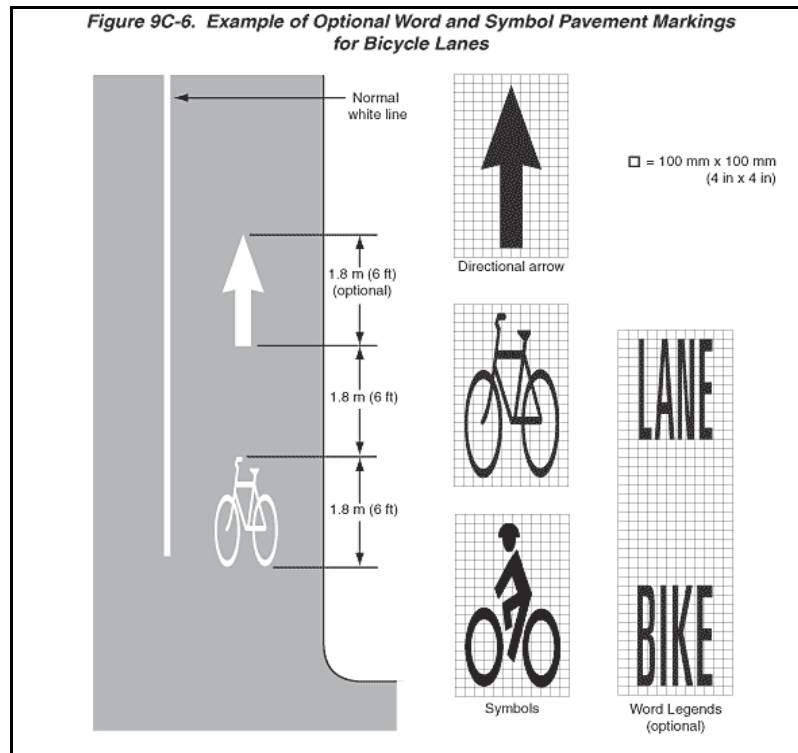


Source: MUTCD



Source: MUTCD

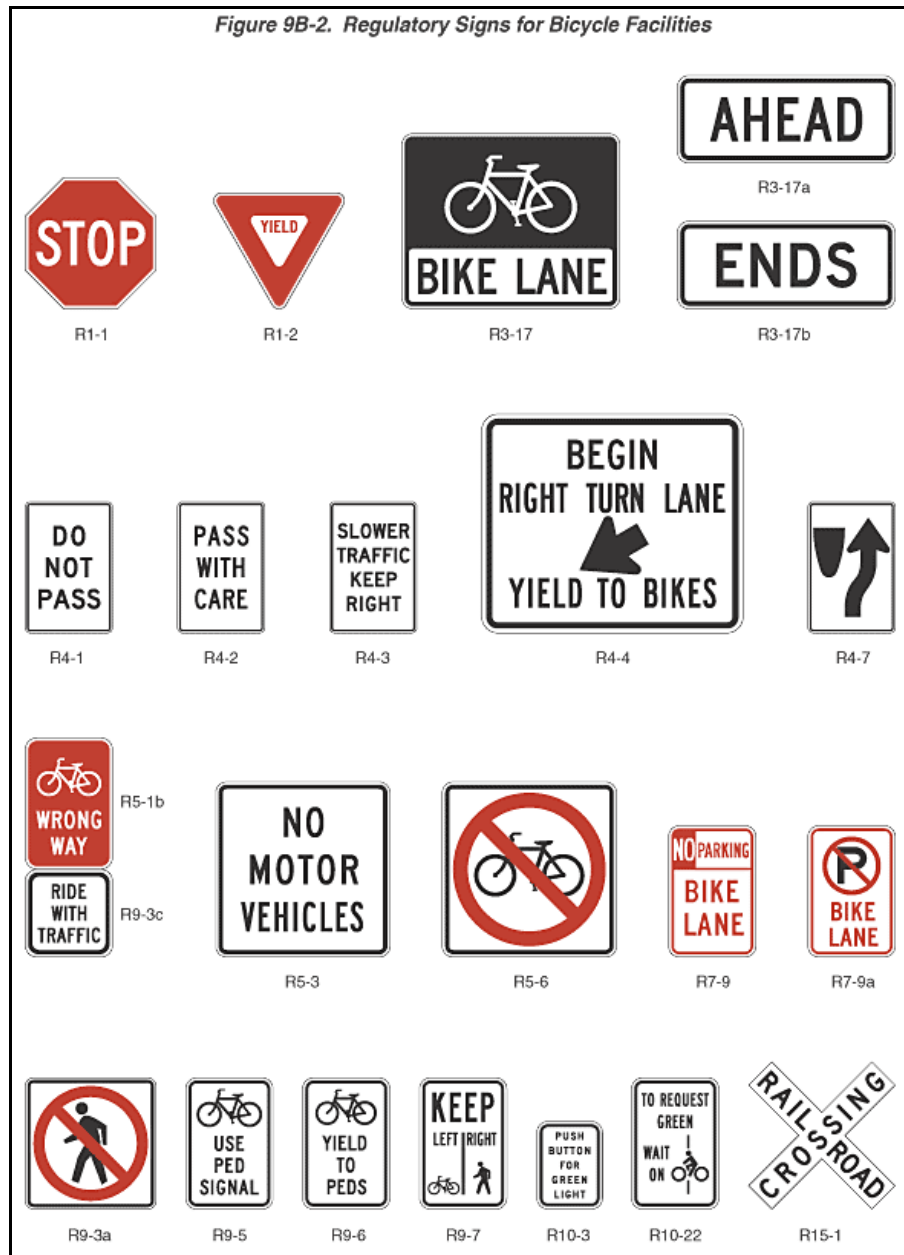
The Manual on Uniform Traffic Control Devices (MUTCD) standard for word and symbol pavement markings for bicycle lanes are the bicycle symbol, or the words BIKE LANE, and a directional arrow. Please see the figure below.



Source: MUTCD

The MUTCD section 9B addresses standard bike lane signing. According to 9B.04, the R3-17 BIKE LANE sign should be used along with the R3-17a sign that says AHEAD in advance of the beginning of a designated bicycle lane to call attention to the lane and to the possible presence of bicyclists. In locations where bicycle lanes are ending, the same R3-17 BIKE LANE sign should be used, with the word ENDS (sign R3-17b) substituting for the word AHEAD. The R7-9 or R7-9a signs should be used along streets where motorists are likely to park or frequently pull into the bike lane. The figure on the following page provides a range of signs that are needed for various bike lane conditions.





Source: MUTCD

Many other signs and pavement markings are needed for the multitude of conditions that arise along bike lane routes and should be implemented in accordance with the MUTCD guidelines. The issue of maintaining signs and pavement markings is one that must be addressed through ongoing funding.

## **LOCATING BIKE LANES**

It is imperative that some sort of bike lane suitability index is used when attempting to identify which street routes are most appropriate for a bike lane facility. When attempting to identify potential bike lane locations, it is useful to ask the following questions:

- What are the most critical segments of the existing bike system that can be complimented by a bike lane facility?
- What segments can be included as features of other planned projects?
- Are there opportunities in the system today that may disappear in the future if certain segments are not implemented soon?
- Which segments can be most easily accomplished? This issue may involve the length of a proposed bike lane facility.

The easily attained segments can play a very important role in that they can provide a starting point and hopefully a positive track record for such a facility in the community thus opening up future opportunities. However, this does not mean a bike lane should be attempted at a particular location simply because it may be more easily attainable, especially if such a location does not provide useful connections for bike riders. Such a strategy could result in a bad example of a bike lane that causes potentially more harm than not doing the project at all. Instead, possible implementation of shorter bike lane segments that connect two high traffic bicycle use locations, such as college campuses or dedicated bike trails, might be considered first.

### **Primary Factors**

There are five primary factors in dealing with placement of bike lanes within a transportation network that should be studied. Each of these factors help indicate the level of stress a bicyclist would feel when traveling in a proposed bike lane and need to be inventoried when attempting to identify the most appropriate location. A bike lane appropriateness index based on these five main factors should be established and used when identifying the locations of these facilities. The primary factors are as follow:

1. Route Continuity and Connectivity
2. Redundancy in Trail Facilities
3. Curb-Lane Width
4. Traffic Volume in the Curb-Lane
5. Traffic Speed

Within these primary factors there are secondary factors that contribute to the overall bike lane appropriateness at a particular location and they will be explained after the primary factors are outlined below.

### Route Continuity and Connectivity

It is extremely important to identify potential bike lane locations based on how the route location will provide both a continuous and easy to follow route structure, as well as how the route will provide key connections between activity centers and destinations. In other words, a bike lane facility should provide a direct, useful, and easily followed route.

By looking at a map of the local roadway system that includes the locations of existing and planned bike trail locations and on-street bike routes, logical bike lane locations can be identified to fill in the gaps in the system. Focus should be placed on those streets that are close in proximity to residential areas, serve popular destinations (parks, schools, commercial centers, employment centers, bike trails), and have good access to surrounding neighborhoods (interconnected streets). Keep in mind that areas that are in need of bicycle facilities may very well be better served by implementing other facility options such as a grade separated bridge or underpass at a busy intersection or roadway, a short section of trail at a key location, or a signed on-street bicycle route through a particular neighborhood.

### Redundancy in Trail Facilities

A very important factor when considering possible bike lane routes is to ensure a potential bike lane facility will not duplicate an existing or a likely future trail facility. This does not mean a bike lane should not be located near a bike trail. In fact, proximity of a bike lane to a bike trail may very well be a common occurrence. However, installing a bike lane along a roadway that has a trail facility within a half mile of the proposed bike lane that runs in the same direction and serves the same neighborhoods and activity centers should be avoided. This will ensure that the bike lanes that are implemented will be more highly utilized and will serve populations that most need such a facility. Over time, with the implementation of bike lanes at other more highly needed locations throughout the community, those bike lane alignments that are in the same proximity of bike trails may be considered for bike lane facilities because they may act as more direct commuter bike lanes than the trail system.

Those alignments that are considered likely candidates for a bike lane facility based on the two above primary considerations should be studied further to identify which streets are the most likely candidates for a bike lane facility based on the remaining primary factors.

### Curb-Lane Width

Curb-lane width is the distance from the curb joint to the first lane line. The gutter pan should not be included when determining the width of the curb-lane since the joint between the lane and the gutter is a hazard for bicycles. It is important to know the width of the curb-lane in order to quantify which streets are more likely or less likely to be good candidates to have a bike lane fit in its cross-section. Those streets with a wider curb-lane width will be considered the more preferred bike lane locations than those with more narrow curb-lanes. When there are parked vehicles in the curb-lane, this measurement should begin from the side of the parked car to the first lane line. A Maryland

Department of Transportation study found that a 15 foot wide curb-lane width or greater, but less than 16 feet, with a posted speed limit of 45 mph or less works best for bike lanes. (MDDOT, 1984) Widths greater than 16 feet may encourage motorists to share the lane with other autos side-by-side, especially near intersections with right turn movements, thus causing additional conflicts with bicyclists. Three other important items related to the width of the curb-lane must be considered. One is if there is a parallel parking lane along the street under consideration, can the parking be removed or the parking lane width be decreased to gain more space for the bike lane? The second is the option to obtain additional right-of-way to gain the needed additional width for the bike lane. Third, can the existing cross-section be restriped with narrower travel and parking lanes to provide enough space for a bike lane? Each of these considerations increase the cost attributed to the installation of a bike lane facility and should be weighed against other routes that may not bring with them such costs.

#### Traffic Volume in Curb-Lane

The amount of automobile traffic in the curb-lane is a primary consideration because the higher the amount of traffic, the lower the level of comfort the bicyclist will have along a particular bike lane location. Thus traffic volumes for particular proposed bike lanes are needed and need to be broken down into specific curb-lane traffic volumes for a rush hour time period. One way to establish this traffic volume number is by using the average daily traffic (ADT) count for the roadway in each direction, divided by the number of thru lanes available for each direction, and then multiply that number by 10% ( $ADT \div \# \text{ thru lanes} \times 0.1$ ). The higher the number, the less ideal the roadway is for a bike lane facility.

#### Motor Vehicle Speed

Using the 85<sup>th</sup> percentile for speed along a roadway under consideration for a bike lane facility is also extremely important because, again, speed of the automobile traffic will determine the level of comfort a bicyclist will have along a particular alignment. It is generally acknowledged that roadways considered for bike lanes should have an 85<sup>th</sup> percentile speed of 45 mph or lower in order to provide a quality riding environment.

#### **Secondary Factors**

Once the primary factors are identified and researched for possible bike lane locations, many streets can be eliminated from the potential listing of bike lanes if some of the primary factors indicate a negative rating. However, the possible alignments that remain will need additional scrutiny to identify which is the most viable and acceptable alignment. To accomplish this, secondary factors are looked at to further the discussion. These factors are as follow:

- Number of commercial/industrial driveways per mile
- Percentage of truck traffic during the peak traffic hour
- Parking conditions in the curb-lane
- Ability to obtain additional right-of-way

- Existing bicycle volumes
- Pavement condition
- Sight distance and other traffic safety factors
- Presence of a bus route along the bike lane route
- Drainage grates along the route
- Intersection turning volumes, especially right-turn movements
- Street grade
- Length of the proposed route (shorter routes may be more feasible to implement while longer routes may over time serve more of the population)
- Neighborhood support for the bike lane facility

The issue of short spacing between non-signalized commercial or industrial driveways is an important indicator of route suitability because the stress level of the bicyclist is compounded when there are numerous non-signalized driveways per mile. The amount of truck traffic is pertinent in that trucks can cause instability for the bicyclist due to air turbulence, blind spots in the truck driver's field of vision, and the amount of pavement width occupied by large trucks. On street parking along a potential route is one of the more obvious issues for bike lanes. The opening of doors and merging of motorists into the traffic lane from a parking space creates conflicts with the bicyclist. Also, the ability to notice a bicyclist in a bike lane may be obscured by the presence of parked vehicles along the curb-lane. Finally, parking turnover rates influence the suitability of a route in that the higher the turnover the more potential conflicts exist. This is less of an issue in residential areas and more of an issue in commercial activity centers.

Cost factors also must be considered whenever implementation issues are discussed. Basic costs such as right-of-way acquisition, additional pavement construction, removal of or limitations on parking, striping, signing, and long term maintenance all need to be considered as part of a bike lane suitability index and be included in a funding program for bike lane implementation.

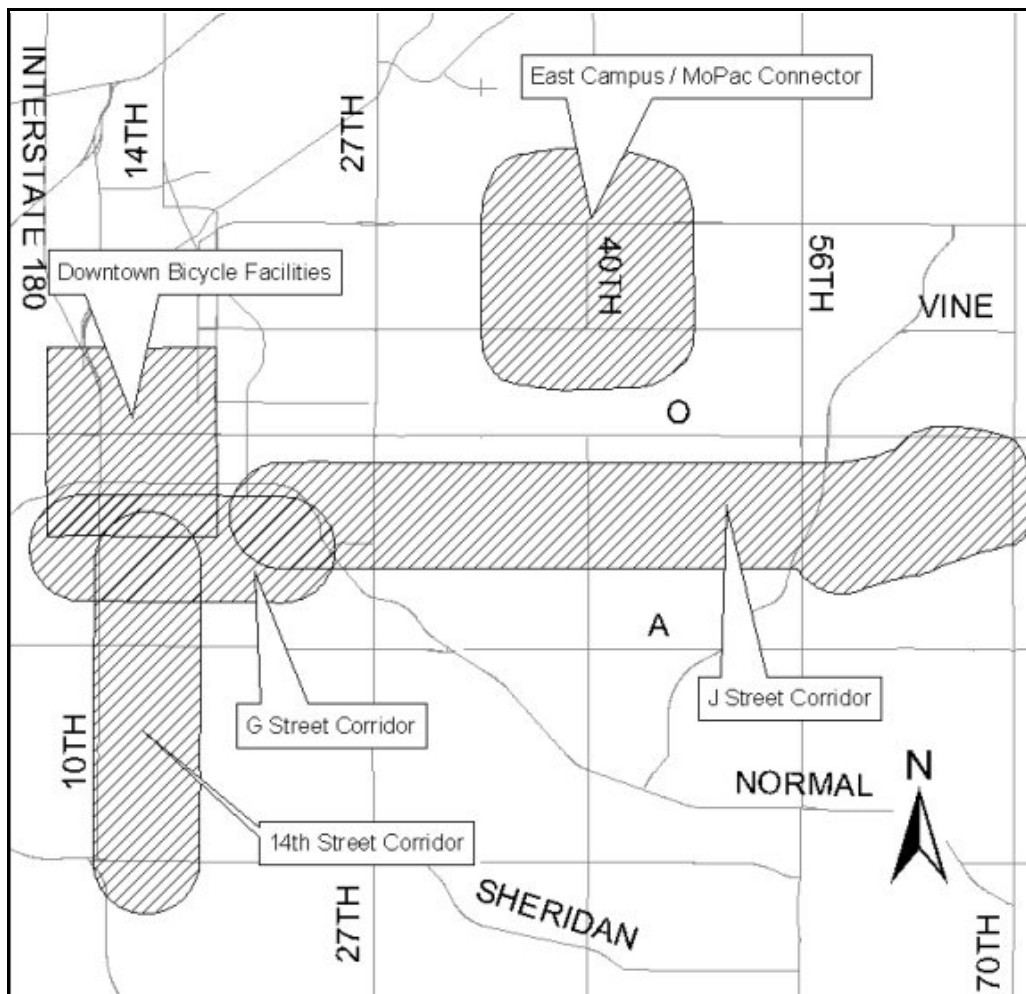
Each of the above factors play a role in determining the suitability and viability of a bike lane along a particular roadway. Use of this information can be used to develop a more detailed rating for bicycle stress level once the initial primary factors determine the basic street compatibility rating of the route in question.

With the implementation of a bike lane suitability index, there will be a need for regular monitoring of implemented bike lanes. This will show what level of use exists and how conditions change over time that may require adjustments to the facility, particularly if there is to be a roadway construction project that may alter the alignment of the street or intersections.

### **SUGGESTED BIKE LANE CORRIDORS TO BE STUDIED FURTHER**

Once a bike lane suitability and rating system is developed, the identification and suitability rating of specific bike lane corridors can begin. Five potential bike lane corridors are suggested below as starting points for possible bike lane development, most likely as pilot studies and projects, in order to establish the first bike lane facilities that best compliment the existing bicycle system. A short explanation of the purpose of a bike lane facility for each of the proposed corridors is provided as is a map showing each general route location on pages 21 through 25. Although specific streets may be included in the descriptions, this review is not intended to specifically identify the exact routes in which to install bike lanes. A complete corridor review and bike lane suitability study is needed to identify the most appropriate locations.

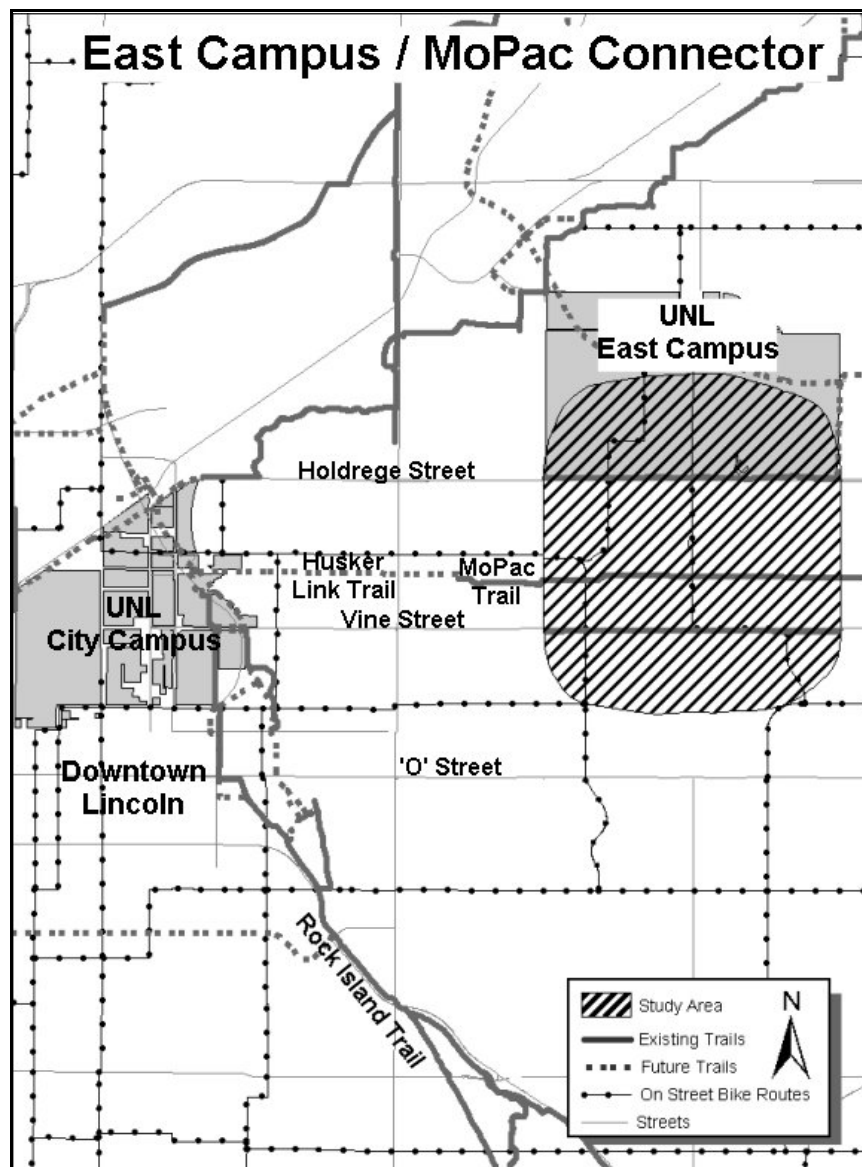
### **SUGGESTED BIKE LANE CORRIDORS TO BE STUDIED FURTHER**





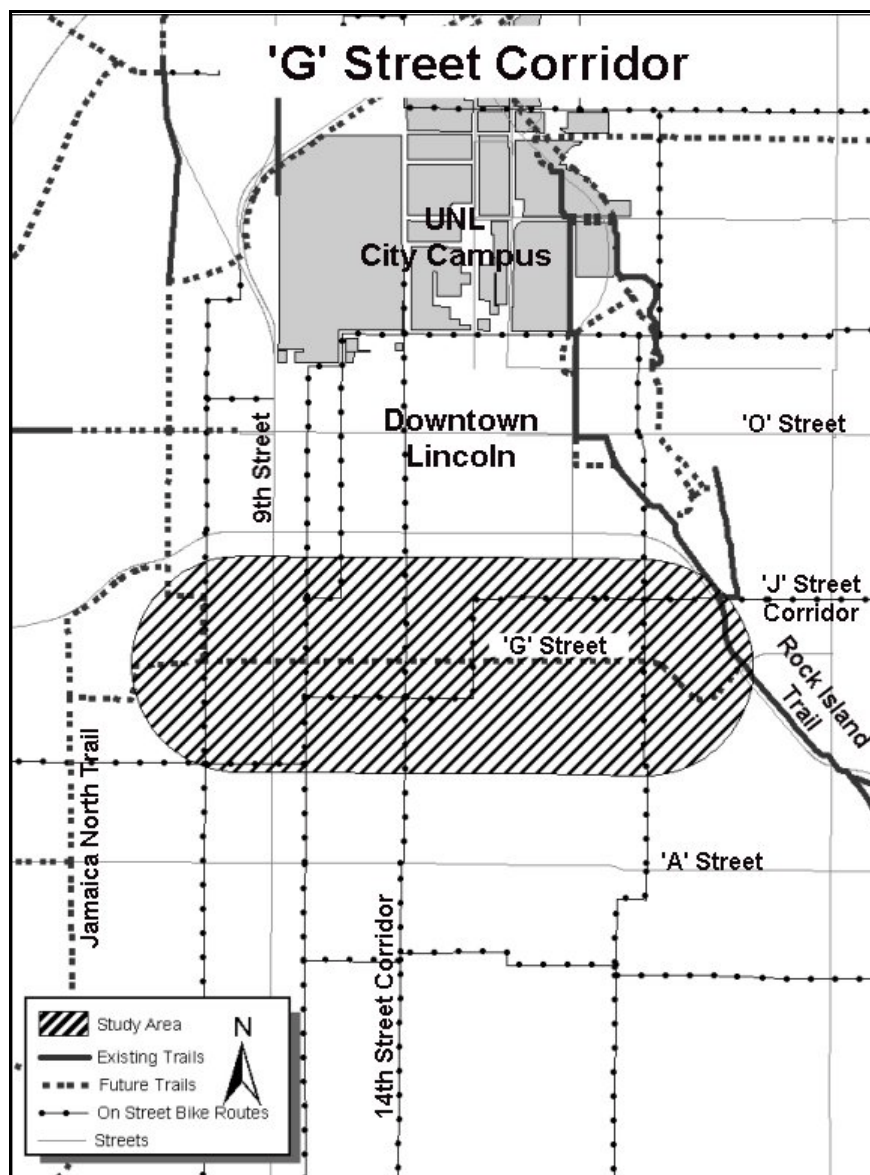
### East Campus/MoPac Connector

This proposed bike lane facility corridor would provide a critical connection between the University of Nebraska-Lincoln East Campus, an activity center for bicycle users, and the MoPac Trail just over ½ mile directly to the south. With the eventual completion of the Husker Link Trail route into the UNL City Campus 3 miles to the east, this proposed bike lane facility would provide a continuous dedicated bike facility between these two major campuses. A bike trail currently runs along Holdrege Street on the south side of the East Campus as well. There are two identified on-street signed bike routes along Idylwild Drive and 40<sup>th</sup> Street that currently run between East Campus and the MoPac Trail that may be candidates for a possible bike lane facility.



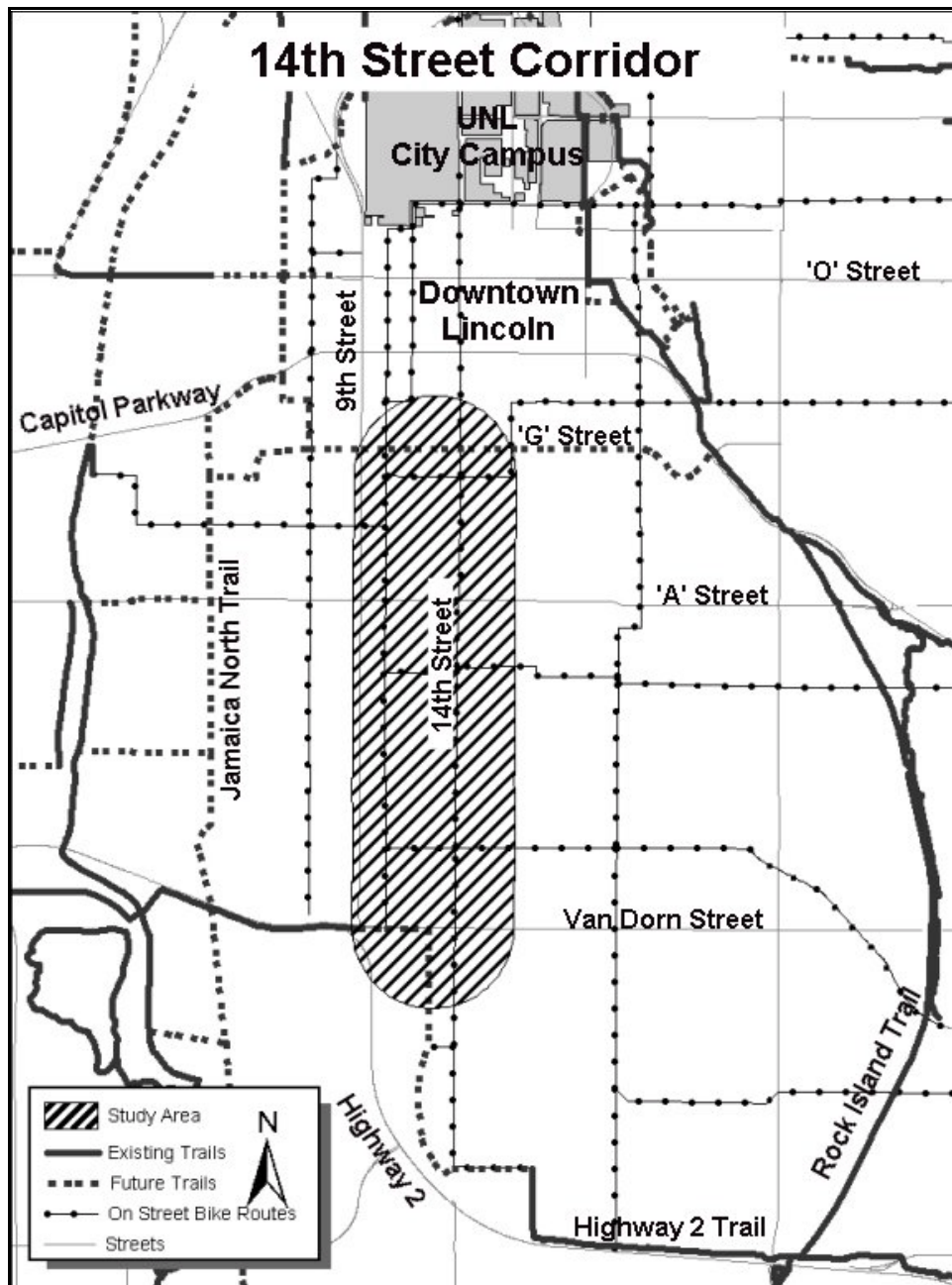
### “G” Street Corridor

This suggested corridor for possible bike lane implementation runs from the existing Rock Island Trail on the east to the planned future Jamaica North Trail on the west. Such a facility along this route would be very useful as a critical east/west connection between these two major trail facilities just south of the Downtown. This route is currently identified in the Comprehensive Plan as a future bike trail facility as it was determined at the time the Plan was adopted that it was a critical connection. This route location is in a built-out neighborhood making the construction of a separate trail facility less likely. However, a bike lane facility may be more feasible and should be considered and studied.



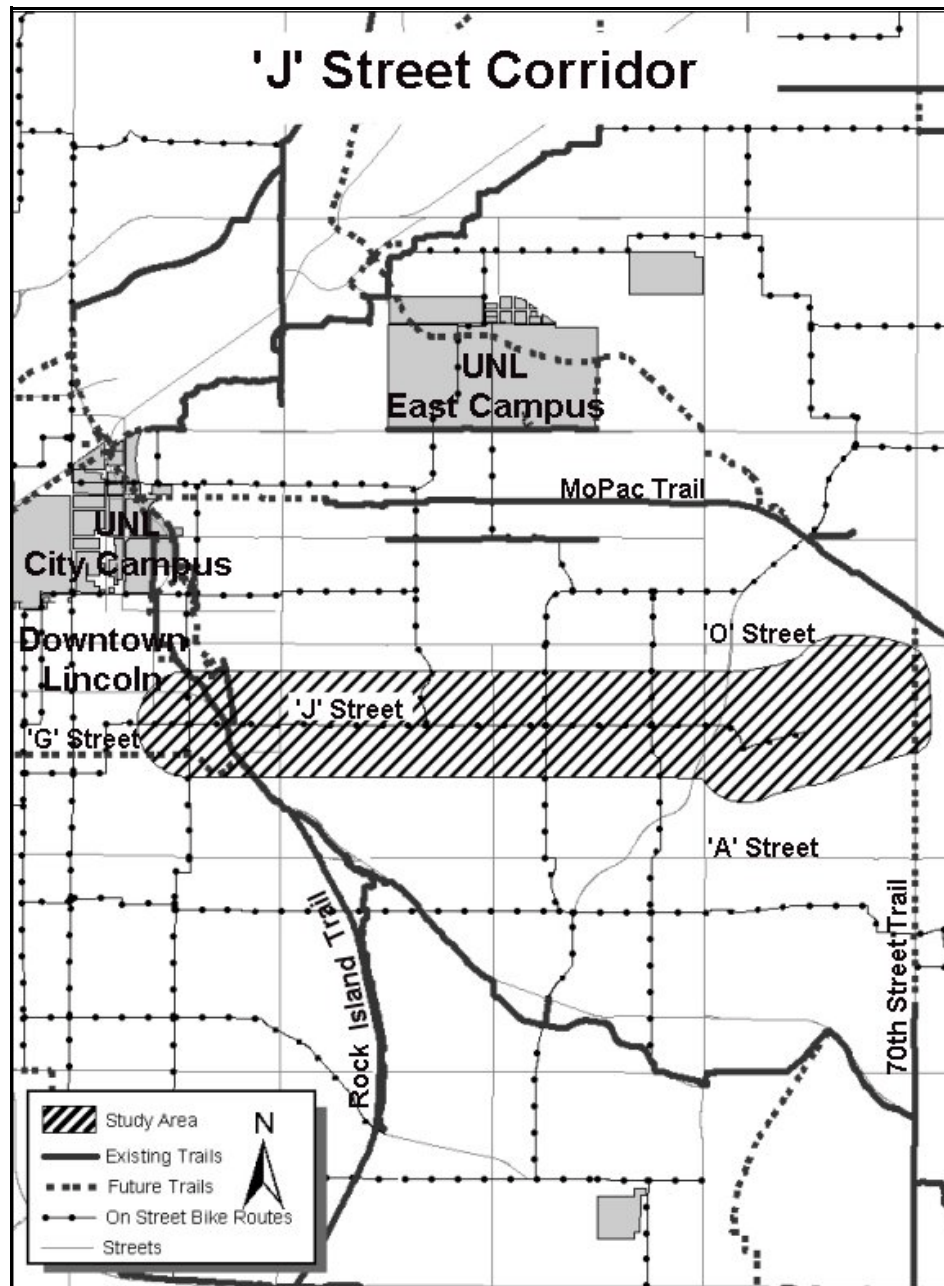
### 14<sup>th</sup> Street Corridor

This suggested north/south corridor would provide a very important facility that would connect the Highway 2 trail to the south and the “G” Street facility to the north and the Downtown area. The Comprehensive Plan currently shows this route as a signed on-street bike route. Neighborhoods to the south of Downtown would be well served by this facility as it would provide a dedicated north/south bike facility between the Rock Island Trail and the future planned Jamaica North Trail.



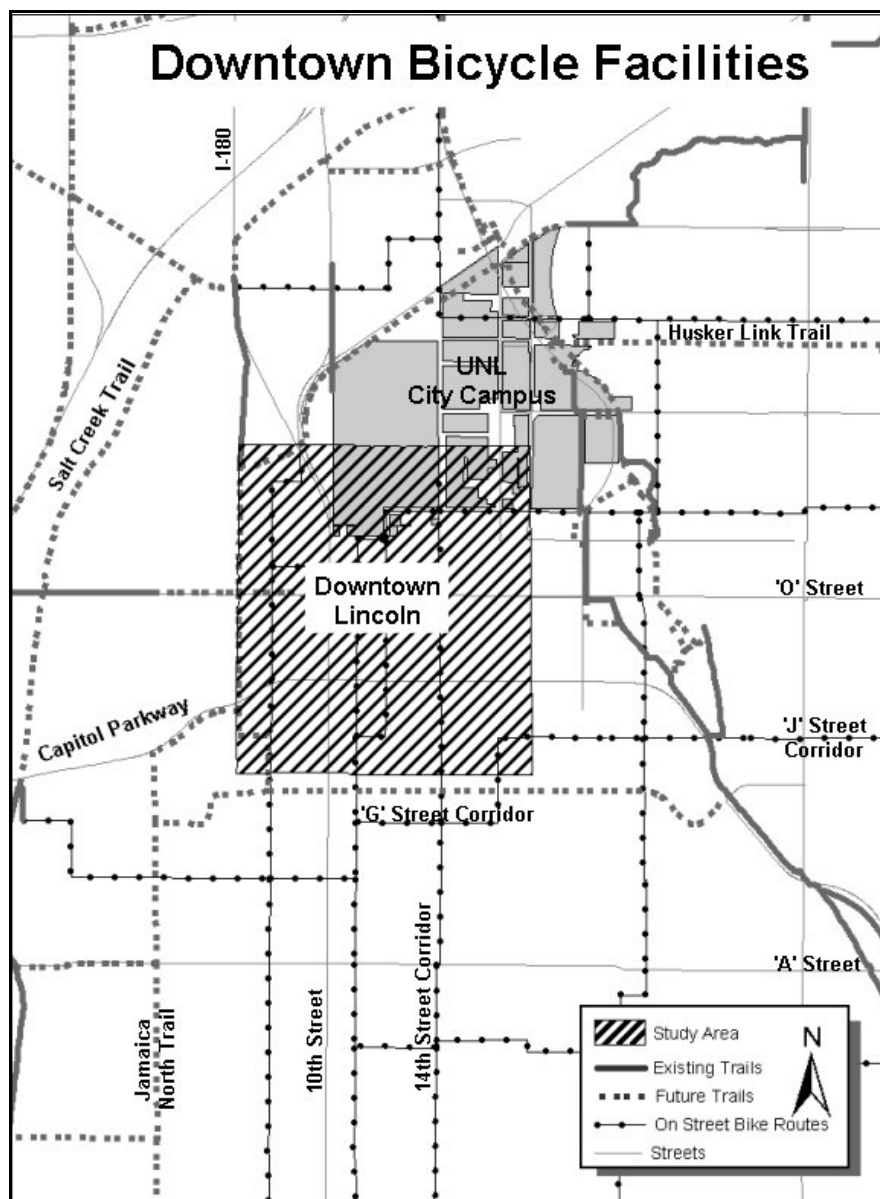
### “J” Street Corridor

This suggested corridor is the longest of those listed in this report. It would provide a continuous east/west dedicated bike facility from the Rock Island Trail and the Downtown area on the western terminus to the future planned 70<sup>th</sup> Street Trail/Gateway/St. Elizabeth/Taylor Park area at the eastern terminus. This route also currently is designated as a signed on-street bike route. This proposed bike lane corridor would also provide access to the MoPac Trail via the 70<sup>th</sup> Street trail.



### Downtown Bicycle Facilities

The issue of bicycle facilities and bicycle accommodation in the Downtown area is one that needs to be addressed and any discussion should include the topic of bike lanes. Bike lanes can provide critical connections within the Downtown area between the many existing and future bike trails that converge on the Downtown as well as the potential bike lane facilities along “G” Street and “J” Street. Also, bike lanes could provide facilities that connect the State Capitol environs and City/County offices to the University, the Haymarket and the Downtown office buildings. This topic will be addressed in the pending Downtown Master Plan effort slated to begin in mid-2004.



## **NEXT STEPS**

Developing bike lane facilities is a complex process that should be part of a formal implementation program. This report identifies many of the standards and issues that need to be included and addressed in any potential bike lane effort. The general guidelines and information identified in this document, as well as the sources cited for this information, will be useful for any future bike lane implementation plan, including information that will be necessary to establish updated roadway standards that include bike lane facilities.

Both drivers and bicyclists will need to learn the rules of the road as they apply to bike lanes. Dissemination of bike lane information through public announcements, public education meetings, and the use of the City/County web page will be needed. Formal training seminars for users, drivers, and administrators will also be needed to make sure the community is informed and knowledgeable about the topic.

When specific routes are formally studied for possible bike lane facilities, a rating system should be developed to help identify which routes make the most sense. Those corridors identified in this report for further study should be considered first when the actual implementation of a bike lane program begins. The topic of bicycle facilities, including bike lanes, in the Downtown area will be studied through the Downtown Plan. Finally, any implementation program will need the type of funding support that will ensure timely and appropriate implementation of bike lane facilities and long-term maintenance of those facilities.



**SOURCES**

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*Safety Benefits of Bike Lanes*, City of Cambridge, MA, 2004.